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13. ABSTRACT (Maximum 200 Words) The goal of this Training Program is to direct talented undergraduates into careers in breast cancer research. The program, called <u>Breast Cancer Undergraduate Research Experience (BCURE)</u> , is a joint program between The University of Maryland Baltimore County (UMBC) and the University of Maryland, Baltimore Medical School (UM,B). The centerpiece of BCURE is a full-time, 10-week summer research experience in the laboratory of an established investigator (mentor) working in breast cancer research. Ten UMBC and UM,B faculty, whose research programs focus on breast cancer, serve as mentors. The Program Director is a well-respected breast cancer investigator who has personally trained >50 undergraduates. Trainees also participate in a Breast Cancer Course and an optional Biomedical Research Ethics course. Trainees present their projects at laboratory meetings, program conferences, UMBC Undergraduate Research Day, as well as at national and international meetings, if appropriate, and in research activities such as journal clubs and seminars. They meet regularly with the Program Director and formally present their research at Breast Cancer Research Day. BCURE trainees include UMBC and non-UMBC undergraduates and represent the diverse population in the Baltimore area. The program includes eight trainees per summer.				
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INTRODUCTION

The development of successful approaches for the prevention and treatment of breast cancer is completely dependent on well-trained, creative, and highly motivated research scientists studying breast biology and breast cancer. It is, therefore, critically important to direct our most talented young investigators into breast cancer research. The goal of the BCURE program is to direct undergraduate students into careers in breast cancer research. Students frequently focus on a particular research question based on an early, successful research experience in that area. By exposing undergraduate students to breast cancer research early during their studies, and giving them an outstanding research experience, we optimize the chances they will focus their research career on breast cancer. There is an existing large pool of UMBC undergraduate students who are academically talented and highly motivated and anxious to be involved in biomedical research. This program will provide these talented undergraduates with opportunities to participate in breast cancer research within the context of their undergraduate education. They will gain valuable experience in a specific area of breast cancer research and focus, and possibly solve, important research questions. In addition, the trainees will be exposed to other areas of breast cancer research through a special Breast Cancer Course and Breast Cancer Research Day. These events will enable students to gain a perspective on the breadth and depth of breast cancer research, and may suggest additional research areas for them to pursue as graduate students and/or post-doctoral fellows, or when they start their own laboratories as independent investigators. Our training faculty (mentors) are well-respected investigators in various areas of breast cancer research, and come from university, medical school, and cancer center settings. They have experience training undergraduates, and are enthusiastic about working with them. They are also very aware of the requirements for training undergraduates vs. graduate or post-doctoral students.

BODY

Key Research Accomplishments:

For the summer 2002 BCURE program:

- ▶ Advertised the BCURE program on the UMBC website and announced it in many undergraduate sciences classes
- ▶ Interviewed applicants and selected eight, high-achieving students to be the second BCURE class (2002 class)
- ▶ Designed the BCURE summer lecture class and made arrangements for five experts in breast cancer plus the PI to present their work for the trainees
- ▶ Assigned eight BCURE students for 2002 to their mentors by matching research interests and personalities
- ▶ Held the first BCURE meeting which served as an orientation for the BCURE 2002 trainees
- ▶ Met regularly throughout the summer of 2002 with the trainee group. Each trainee presented the status of their project at each meeting.
- ▶ Regularly contacted the mentors throughout the summer of 2002 to find out how each BCURE trainee was performing and if there were any problems

- ▶ Trainees presented their research projects in poster format at the end-of-the-summer undergraduate research “fest” at UMBC in August 2002
- ▶ Three of the eight trainees continued to work in their mentors’ research laboratory throughout the academic year (2002-2003)
- ▶ Trainees presented the final version of their projects in poster format at “Breast Cancer Research Day,” on April 24, 2002, an annual event featuring the trainees and an outside speaker/expert in breast cancer. (See “Reportable Outcomes”)

For the summer 2003 BCURE program:

- ▶ Advertised the 2003 BCURE program throughout UMBC in undergraduate classes and on the university website
- ▶ Contacted potential mentors (including new mentors not previously participating in the program) at UMBC and UM,B to ascertain they were enthusiastic about hosting BCURE students for the summer of 2003
- ▶ Reviewed written applications of potential students; interviewed approximately 15 students; selected eight students as BCURE 2003 trainees
- ▶ Organized summer 2003 breast cancer course and arranged for five breast cancer researchers plus the PI to present their work for the trainees

Reportable Outcomes:

- ▶ Eight undergraduate trainees worked during the summer of 2002 for 10 weeks each with individual faculty mentors studying basic questions in breast cancer.
- ▶ Three trainees continued working in their mentors’ laboratories during the academic year (2002-2003)
- ▶ One trainee from the BCURE 2001 program activated her American Association for Cancer Research (AACR) travel award to attend the AACR annual conference in 2003 (Conference moved from Toronto to Washington, DC because of SARS.).
- ▶ All trainees presented their final projects in poster format at the annual “Breast Cancer Research Day,” April 24, 2003. Dr. Nora Disis from the U. of Washington in Seattle was the invited outside breast cancer expert. This event is a university-wide function at which an outside expert in breast cancer research presents his/her work and interacts with each student.
- ▶ Several of the BCURE 2001 students were accepted into biomedical research graduate programs for the fall 2003

CONCLUSIONS

The second year of the BCURE program for training undergraduates in breast cancer research has been even more successful than the first year. The program has continued to attract a group of very high-achieving and highly motivated students who are committed to gaining training in breast cancer research. All trainees had enjoyable and productive research experiences. The mentors were satisfied with the students’ efforts. In discussion with students at the end of the summer and on Breast Cancer Research Day in May of 2003, about half of the trainees said they

mentors were satisfied with the students' efforts. In discussion with students at the end of the summer and on Breast Cancer Research Day in May of 2003, about half of the trainees said they were seriously considering incorporating research into their future career goals. *As PI of the program, I was very disappointed to learn that the Undergraduate Training Grant Program is not being continued.* Our BCURE program has developed significant momentum and is having very real impact on the futures of the participating students. This program is an outstanding vehicle for training the next generation of breast cancer researchers, and therefore for facilitating the development of a cure for breast cancer. We are looking for additional sources of support to maintain this program.

REFERENCES: None

APPENDICES:

Appendix 1: Trainees for the summer 2002 program.

Appendix 2: Faculty mentors for the summer 2002 program.

Appendix 3: Expectations for BCURE Trainees for 2002

Appendix 4: BCURE speaker schedule for 2002

Appendix 5: Brochure title pages for 2nd Annual Breast Cancer Research Day

Appendix 6: Brochure title pages for 5th Annual Summer Undergraduate Research Fest

Appendix 1; Trainees for the summer 2002 BCURE Program

<u>Trainee</u>	<u>College Year Completed at the Start of the Program</u>
Mr. Timothy Phelan	sophomore year (UMBC)
Ms. Terri Hines	sophomore year (UMBC)
Ms. Paz Luncsford	sophomore year (UMBC)
Mr. Seth Miller	freshman year (UMBC)
Mr. Nitin Sardana	freshman year (UMBC)
Ms. Jasjit Saini	sophomore year (UMBC)
Mr. Erik Strauss	sophomore year (UMBC)
Ms. Natalia Tierra	sophomore year (UMBC)

Appendix 2: Faculty mentors for the summer 2002 program.

<u>Faculty Mentor</u>	<u>Laboratory Location</u>
Dr. Tony Passaniti	Cancer Center, UM,B
Dr. Suzanne Ostrand-Rosenberg	Dept. Biological Sciences, UMBC
Dr. Don Creighton	Chemistry Dept., UMBC
Dr. Anne Hamberger	Dept. Pathology, UM,B
Dr. Sandra McLeskey	School of Nursing, UM,B.
Dr. Ginette Serrero	Dept. Pharmacology, UM,B
Dr. Mark Marten	Dept. Biochem. Engineering, UMBC.
Dr. Brian Bradley	Dept. Biological Sciences, UMBC

Appendix 3

BCURE Program at UMBC 2002 - Expectations for BCURE Trainees

1. BCURE Trainees are expected to participate in summer laboratory research for a period of 10 weeks. This participation includes regular attendance in their host labs for at least 40 hours a week. BCURE Research Mentors must approve any deviations in student schedules including vacations and non-emergency medical and dental appointments in advance.
2. A BCURE biweekly time sheet will be provided to record the time each student spends in the research lab. These sheets should be completed by the student, signed by the BCURE Research Mentor, and turned into Mrs. Sutphin within one week of the last day of the ten work day reporting period.
3. BCURE Trainees are expected to participate in all program activities especially those that are part of their host research laboratory, such as lab meetings/conferences, journal clubs, etc.
4. BCURE Trainees are expected to attend the BCURE program meetings at UMBC. BCURE Research Mentors will be informed of the BCURE Trainees' obligation to attend these meetings and the dates. Program Meetings will usually be held biweekly and are tentatively scheduled for: June 3, June 13, June 25, July 9, July 22, and August 1, 2001. Trainees are also expected to participate in the end-of-summer research fest on August 7, 2002.
5. At the biweekly program meetings, BCURE Trainees are expected to present a brief overview of what they are doing in their labs and participate in the discussions of the presentations by the speakers.
6. At the end of the ten-week research internship, students are expected to write a summary of their research work, have the summary reviewed and approved by their research mentor, and submit the final summary to Dr. Rosenberg. This summary will serve as a foundation for the research poster that will be prepared over the academic year for presentation at the Spring 2003 BCURE Breast Cancer Research Day at UMBC.
7. Trainees should be proud of their acceptance in the BCURE Program and are asked to remember that they represent the BCURE Program and UMBC during their participation in the program.
8. BCURE Trainees were expected to complete a Stipend Agreement form as part of their participation in the program. These forms were distributed in May and were to be returned to Mrs. Sutphin prior to the start of the program on June 3. Students were given an extra copy of the agreement for their records.
9. Generally, BCURE Trainees will receive a \$3,500 summer stipend for their ten-week participation in the program and will receive an additional \$500 stipend after they participate in the Spring 2003 BCURE Breast Cancer Research Day.
10. Generally, Trainees will receive their summer stipend through the UMBC payroll system in five payments of \$700 each paid on July 5, July 19, August 2, August 16, and August 30. Students are required to present their Driver's License and Social Security Card at the June 3 Orientation and Program Meeting and complete all required payroll information during the orientation to prevent any delay in receiving their stipend payments. Any Trainees who are not U.S. Citizens must present a current passport or other document demonstrating their U.S. residency status during the June 3 orientation.
11. In addition to the BCURE Breast Cancer Research Fest in the Spring of 2003, BCURE trainees may be asked to participate in occasional other events during the 2002-2003 academic year. Such events may include seminars by outside experts in breast cancer research, or other breast cancer related activities. BCURE students should also seriously consider taking the one credit Research Ethics course (BIOL/CHEM 397) offered during the spring semester, 2003.

IMPORTANT: It is the responsibility of the BCURE Trainee to inform Dr. Rosenberg or Mrs. Sutphin immediately if she or he is having any problems related to BCURE Program participation.

Appendix 4

BCURE Speaker Schedule Summer 2002

All sessions will convene at 9:00 am in room 461 of the Biological Sciences Building at UMBC *unless otherwise indicated*. The June 3 session will be an introductory meeting and will end at approximately 12:30 pm. All subsequent sessions will end at approximately 11:00 am. All participating BCURE students are expected to attend all sessions. Please note that sessions are on Mondays, Tuesdays, or Thursdays.

June 3, Monday	Introductory meeting. Discussion of BCURE goals, student expectations, faculty expectations, parking at UM,B, and other misc. administrative affairs. Laboratory safety video will be shown. A lecture entitled "Overview of Breast Cancer" will be given by Dr. Suzanne Rosenberg, UMBC.
June 13, Thursday	<u>Speaker:</u> Dr. Don Creighton, UMBC <u>Title:</u> <i>Using Enzymes to Selectively Inhibit Breast Tumors</i>
June 25, Tuesday	<u>Speaker:</u> Dr. Ginette Serrero, UM,B <u>Title:</u> <i>Identification of a novel molecular target for tamoxifen resistant breast cancer.</i>
July 9, Tuesday	<u>Speaker:</u> Dr. Sandra McLeskey, UM,B <u>Title:</u> <i>Angiogenesis Research in Breast Cancer</i>
July 22, Monday	<u>Speaker:</u> Dr. Anne Hamberger, UM,B <u>Title:</u> <i>ErbB receptors in breast cancer</i>
Aug. 1, Thursday	<u>Speaker:</u> Dr. Tony Passaniti, UM,B <u>Title:</u> <i>Runx developmental genes and transcriptional regulation of angiogenesis</i>

Second Annual BCURE Breast Cancer Research Day

BCURE Program at UMBC

Department of Biological Sciences

UMBC – University of Maryland, Baltimore County

Thursday, April 24, 2003

Albin O. Kuhn Library and Gallery, 7th Floor

BCURE – Breast Cancer Undergraduate Research Experience

THE 2002-2003 BCURE PROGRAM AT UMBC

IMMUNOSUPPRESSION
 Illustration of three mice.
 HN-1 5'-ACA GGC TGT GGT CAG AGT -3'

IMMUNOLOGY
 Diagram of a Y-shaped antibody and a cell labeled "Stat 6".

OLIGONUCLEOTIDES
 Circular plasmid map labeled "pGEM5zf 3001 bp" and "uPAR 981 bp".

RECOMBINANT DNA

PROTEOMICS
 3D ribbon diagram of a protein structure.

LONG TERM GROWTH ASSAY
 Line graph showing growth over 8 days. The y-axis ranges from 0 to 140. The curve starts at (1, 0) and rises to approximately (8, 120).

Day	Growth
1	0
2	5
3	10
4	20
5	40
6	60
7	80
8	120

TRANSCRIPTION FACTOR
 Diagram of a transcription factor bound to a DNA double helix.

Glx1 inactivator
 Chemical structure of a Glx1 inactivator: BrCC(=O)OCCCCOC(=O)CC

Second Annual BCURE

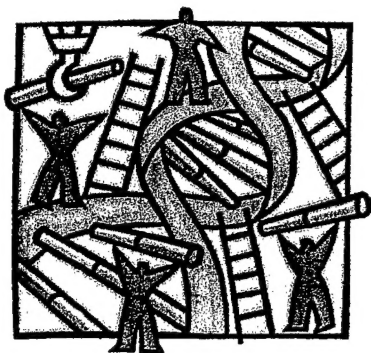
Breast Cancer Research Day

April 24, 2003

BCURE Breast Cancer Research Day

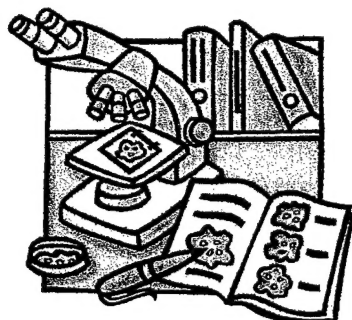
Thursday, April 24, 2003
Schedule of Events
Albin O. Kuhn Library and Gallery, 7th Floor

- 10:00 to 12:00 PM - Poster Set Up
- 1:30 to 1:45 PM - Mini Awards Ceremony and Introduction of the 2003-2004 BCURE Trainees
- 1:45 to 2:45 PM - Seminar for Faculty and Students
- Mary (Nora) L. Disis, MD**
Associate Professor
Division of Oncology
University of Washington School of Medicine
Seattle, Washington
- "Breast Cancer Vaccines"
- 2:45 - 4:45 PM - Poster Session by the 2002-2003 BCURE Trainees
- Poster Session One – 2:45 to 3:50 PM
- Terri T. Hines** - Poster Display Unit #1
Seth M. Miller - Poster Display Unit #3
Tim P. Phelan - Poster Display Unit #5
Natalia T. Tuera - Poster Display Unit #7
- Refreshments - 3:50 to 4:00 PM
- Poster Session Two – 4:00 to 4:45 PM
- Paz J. Luncsford** - Poster Display Unit #2
Nitin Sardana - Poster Display Unit #4
Jasjit K. Saini - Poster Display Unit #6
Erik Strauss - Poster Display Unit #8
- 4:45 to 5:00 PM 2002 - 2003 Trainees meet with Mrs. Sutphin in Library 767



***Fifth Annual UMBC
Summer Undergraduate
Research Fest***

Wednesday, August 7, 2002



PRESENTED BY THE FOLLOWING PROGRAMS:

BREAST CANCER UNDERGRADUATE RESEARCH EXPERIENCE (BCURE)

EXPERIENCES IN MOLECULAR BIOLOGY ACADEMIC RESEARCH CAREERS (EMBARC)

MINORITY ACCESS TO RESEARCH CAREERS,

UNDERGRADUATE STUDENT TRAINING IN ACADEMIC RESEARCH (MARC U*STAR)

SUMMER BIOMEDICAL TRAINING



Fifth Annual UMBC Summer Undergraduate Research Fest

**Wednesday, August 7th, 2002
Lecture Hall III, Administration Building
7th Floor, Library**

We would like to thank the following for providing student support:

*Department of Defense Breast Cancer Research Program
(BCURE)*

*National Institute of Health, National Institute of General Medical Sciences
(MARC U*STAR)
(Summer Biomedical Training – IMSD)*

*National Science Foundation, Research Experiences for Undergraduates
(EMBARC)*